CLAIMS

1. A catalyst structure (21) for use in manufacturing a carbon nanotube (24) of crystalline carbon by means of vapor deposition, which includes a catalytic material that forms a ring or a whirl on a crystal growth surface (22).

2. The catalyst structure according to claim 1, the catalyst structure being a columnar body with its upper surface serving as said crystal growth surface (22), at least part of a side of said columnar body having a non-catalytic material with substantially no catalytic activity with respect to a growth of said crystalline carbon.

3. The catalyst structure according to claim 2, wherein said non-catalytic material includes one or more selected from the group consisting of Ag, Au, Ru, Rh, Pd, Os, Ir and Pt.

4. The catalyst structure according to claim 2, wherein said catalytic material is made of one or more selected from the group consisting of Fe, Co, Mo and Ni, and said non-catalytic material is made of Ag and/or an Ag containing alloy.

5. The catalyst structure according to claim 1, wherein said catalytic material has a multilayer structure.

6. The catalyst structure according to claim 1, wherein at least said crystal growth surface (22) of said catalytic material is oxidized.

7. The catalyst structure according to claim 1, wherein said crystal growth surface (22) has a wavelike ring configuration.

8. A method of manufacturing a carbon nanotube (24), the method using a catalyst structure (21) having a catalytic material that forms a ring or a whirl on a crystal growth surface (22), said crystal growth surface (22) being contactable with a feedstock gas for vapor deposition of crystalline carbon on said crystal growth surface (22).

9. The method of manufacturing a carbon nanotube according to claim 8, wherein said carbon nanotube (24) is produced at a temperature not higher than a deformation temperature of said non-catalytic material.

10. The method of manufacturing a carbon nanotube according to claim 8, wherein, in an assembly of a plurality of catalyst structures (21), a throughhole is provided between said catalyst structures (21) within said assembly.

11. The method of manufacturing a carbon nanotube according to claim 8, wherein said feedstock gas is flown in a direction perpendicular to said crystal growth surface (22).

12. The method of manufacturing a carbon nanotube according to claim 8, wherein a columnar assembly is formed by a plurality of catalyst structures (21), and a non-catalytic material is provided in contact with at least part of a side of said assembly with its upper surface serving as a crystal growth surface (22), and the variation in a cross section of catalytic material measured on the crystal growth surface (22) among said plurality of said catalyst structures (21) is not more than CV 10%.

13. The method of manufacturing a carbon nanotube according to claim 8, wherein said crystal growth surface (22) undergoes a sputtering.

14. The method of manufacturing a carbon nanotube according to claim 13,

wherein said sputtering is performed using cluster ion beam or ultrashort pulse laser.

15. The method of manufacturing a carbon nanotube according to claim 8, wherein said catalytic material undergoes a reactivation employing one or more of chemical polishing, physical polishing and sputtering.